

Use of Cyclic Carbonates as Moisturisers

Field of the Invention

This invention relates to the use of cyclic carbonates as moisturizers in cosmetic preparations.

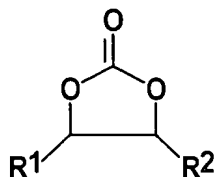
5 Prior Art

Compounds with moisture-dispensing properties, for example glycerin, sorbitol, propylene glycol or dipropylene glycol, are known from the prior art. Despite these properties, there is still a need for moisturizers which are more effective than the hitherto known compounds and in addition have fewer disadvantages and, for example, are less tacky, have a higher consistency and at the same time are free from unwanted residues. Accordingly, the goal is to find compounds which, besides their moisture-dispensing properties, eliminate these disadvantages and also show improved spreading and absorption behavior. There is a particular interest in substances which have a longer-lasting effect than the already known substances.

The problem addressed by the present invention was to provide moisturizers which would fulfil the complex requirement profile described above and which in particular would have an additional long-term effect.

20 Description of the invention

The present invention relates to the use of cyclic carbonates corresponding to formula (I):



(I)

in which R^1 and R^3 independently of one another represent hydrogen, linear and branched alkyl groups containing 1 to 4 carbon atoms and R^2 is a linear or branched alkyl group containing 1 to 4 carbon atoms or a CH_2-OR^3 group, as moisturizers in cosmetic preparations, for example skin and hair care preparations.

It has surprisingly been found that cyclic carbonates have excellent moisture-dispensing properties in cosmetic preparations, more particularly skin care preparations. Another advantage lies in the long-lasting effect by comparison with care products containing glycerin. At the physiological pH of 7.4, glycerin is released, for example from glycerin carbonate, in relatively deep skin layers, so that another advantage consists in the use as a so-called prodrug. In addition, skin care preparations containing cyclic carbonates have a higher consistency, are easier to process, show more advantageous skin-smoothing properties and are absorbed more quickly. They also leave less residue and show reduced tackiness. An additional advantage is the utilization of the moisture-dispensing properties of cyclic carbonates in the hair so that the hair can be protected against heat from hair dryers.

20 **Cyclic carbonates**

Cyclic carbonates are normally produced by transesterification of dimethyl carbonate or diethyl carbonate with glycerin or vicinal diols, preferably 1,2-diols. Typical examples of suitable cyclic carbonates are the transesterification products of the lower dialkyl carbonates mentioned with ethylene glycol, pentane-1,2-diol, hexane-1,2-diol, octane-1,2-diol, decane-1,2-diol, dodecane-1,2-diol and hexadecane-1,2-diol. The diols mentioned are generally prepared by ring opening of the corresponding terminal olefin epoxides with water. Similarly, the 1,2-diols obtained from internal olefin epoxides may also serve as starting materials. The use of glycerin carbonate is preferred from the applicational perspective. The cyclic

carbonates may make up between 0.01 and 50% by weight, preferably between 0.1 and 30% by weight and more preferably between 5 and 10% by weight of the cosmetic preparations.

5 Oil components

The cyclic carbonates may be used together with oil components. Suitable oil components are, for example, Guerbet alcohols based on fatty alcohols containing 6 to 18 and preferably 8 to 10 carbon atoms, esters of linear C₆₋₂₂ fatty acids with linear C₆₋₂₂ fatty alcohols, esters of branched C₆₋₁₃ carboxylic acids with linear C₆₋₂₂ fatty alcohols, esters of linear C₆₋₂₂ fatty acids with branched alcohols, more particularly 2-ethyl hexanol, esters of hydroxycarboxylic acids with linear or branched C₆₋₂₂ fatty alcohols, more particularly dioctyl malate, esters of linear and/or branched fatty acids with polyhydric alcohols (for example propylene glycol, dimer diol or trimer triol) and/or Guerbet alcohols, triglycerides based on C₆₋₁₀ fatty acids, liquid mono-/di-/triglyceride mixtures based on C₆₋₁₈ fatty acids, esters of C₆₋₂₂ fatty alcohols and/or Guerbet alcohols with aromatic carboxylic acids, more particularly benzoic acid, esters of C₂₋₁₂ dicarboxylic acids with linear or branched alcohols containing 1 to 22 carbon atoms or polyols containing 2 to 10 carbon atoms and 2 to 6 hydroxyl groups, vegetable oils, branched primary alcohols, substituted cyclohexanes, linear and branched C₆₋₂₂ fatty alcohol carbonates, Guerbet carbonates, esters of benzoic acid with linear and/or branched C₆₋₂₂ alcohols (for example Finsolv® TN), linear or branched, symmetrical or nonsymmetrical dialkyl ethers containing 6 to 22 carbon atoms per alkyl group, ring-opening products of epoxidized fatty acid esters with polyols, silicone oils and/or aliphatic or naphthenic hydrocarbons.

Emulsifiers

The cyclic carbonates may be used together with emulsifiers.

Suitable emulsifiers are, for example, nonionic surfactants from at least one of the following groups:

- 5 (1) products of the addition of 2 to 30 moles of ethylene oxide and/or 0 to 5 moles of propylene oxide onto linear fatty alcohols containing 8 to 22 carbon atoms, onto fatty acids containing 12 to 22 carbon atoms and onto alkylphenols containing 8 to 15 carbon atoms in the alkyl group;
- (2) C_{12/18} fatty acid monoesters and diesters of products of the addition of 1 to 30 moles of ethylene oxide onto glycerin;
- 10 (3) glycerin monoesters and diesters and sorbitan monoesters and diesters of saturated and unsaturated fatty acids containing 6 to 22 carbon atoms and ethylene oxide adducts thereof;
- (4) alkyl mono- and oligoglycosides containing 8 to 22 carbon atoms in the alkyl group and ethoxylated analogs thereof;
- 15 (5) addition products of 15 to 60 moles of ethylene oxide onto castor oil and/or hydrogenated castor oil;
- (6) polyol esters and, in particular, polyglycerin esters such as, for example, polyglycerin polyricinoleate, polyglycerin poly-12-hydroxystearate or polyglycerin dimerate. Mixtures of compounds from several of these classes are also suitable;
- 20 (7) products of the addition of 2 to 15 moles of ethylene oxide onto castor oil and/or hydrogenated castor oil;
- (8) partial esters based on linear, branched, unsaturated or saturated C_{6/22} fatty acids, ricinoleic acid and 12-hydroxystearic acid and glycerin, polyglycerin, pentaerythritol, dipentaerythritol, sugar alcohols (for example sorbitol), alkyl glucosides (for example methyl glucoside, butyl glucoside, lauryl glucoside) and polyglucosides (for example cellulose);
- 25 (9) mono-, di and trialkyl phosphates and mono-, di- and/or tri-PEG-alkyl phosphates and salts thereof;
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- (10) wool wax alcohols;
(11) polysiloxane/polyalkyl polyether copolymers and corresponding derivatives;
(12) mixed esters of pentaerythritol, fatty acids, citric acid and fatty alcohol according to **DE-PS 11 65 574** and/or mixed esters of fatty acids containing 6 to 22 carbon atoms, methyl glucose and polyols, preferably glycerin or polyglycerin, and
(13) polyalkylene glycols.

The addition products of ethylene oxide and/or propylene oxide onto fatty alcohols, fatty acids, alkylphenols, glycerin monoesters and diesters and sorbitan monoesters and diesters of fatty acids or onto castor oil are known, commercially available products. They are homolog mixtures of which the average degree of alkoxylation corresponds to the ratio between the quantities of ethylene oxide and/or propylene oxide and substrate with which the addition reaction is carried out. $C_{12/18}$ fatty acid monoesters and diesters of addition products of ethylene oxide onto glycerin are known as refatting agents for cosmetic preparations from **DE-PS 20 24 051**.

$C_{8/18}$ alkyl mono- and oligoglycosides, their production and their use as surfactants are known from the prior art. They are produced in particular by reaction of glucose or oligosaccharides with primary alcohols containing 8 to 18 C atoms. So far as the glycoside component is concerned, both monoglycosides, in which a cyclic sugar unit is attached to the fatty alcohol by a glycoside linkage, and oligomeric glycosides with a degree of oligomerization of preferably up to about 8 are suitable. The degree of oligomerization is a statistical mean value on which a homolog distribution typical of such technical products is based.

Zwitterionic surfactants may also be used as emulsifiers. Zwitterionic surfactants are surface-active compounds which contain at least one quaternary ammonium group and at least one carboxylate and one sulfonate group in the molecule. Particularly suitable zwitterionic

surfactants are the so-called betaines, such as the N-alkyl-N,N-dimethyl ammonium glycinate, for example cocoalkyl dimethyl ammonium glycinate, N-acylaminopropyl-N,N-dimethyl ammonium glycinate, for example cocoacylaminopropyl dimethyl ammonium glycinate, and 2-alkyl-3-carboxymethyl-3-hydroxyethyl imidazolines containing 8 to 18 carbon atoms in the alkyl or acyl group and cocoacylaminoethyl hydroxyethyl carboxymethyl glycinate. The fatty acid amide derivative known by the CTFA name of *Cocamidopropyl Betaine* is particularly preferred. Other suitable emulsifiers are ampholytic surfactants. Ampholytic surfactants are surface-active compounds which, in addition to a C_{8/18} alkyl or acyl group, contain at least one free amino group and at least one -COOH or -SO₃H group in the molecule and which are capable of forming inner salts. Examples of suitable ampholytic surfactants are N-alkyl glycines, N-alkyl propionic acids, N-alkylaminobutyric acids, N-alkyliminodipropionic acids, N-hydroxyethyl-N-alkylamidopropyl glycines, N-alkyl taurines, N-alkyl sarcosines, 2-alkylaminopropionic acids and alkylaminoacetic acids containing around 8 to 18 carbon atoms in the alkyl group. Particularly preferred ampholytic surfactants are N-cocoalkylaminopropionate, cocoacylaminoethyl aminopropionate and C_{12/18} acyl sarcosine. Besides ampholytic emulsifiers, quaternary emulsifiers may also be used, those of the esterquat type, preferably methyl-quaternized difatty acid triethanolamine ester salts, being particularly preferred.

Commercial applications

The cyclic carbonates to be used in accordance with the invention, preferably glycerin carbonate, are distinguished by the fact that they may be used as moisturizers in cosmetic preparations, for example skin and hair care products. They are present in cosmetic and pharmaceutical preparations in quantities of generally 0.1 to 25% by weight, preferably 0.5 to 15% by weight and more preferably 2 to 5% by weight.

Cosmetic and/or pharmaceutical preparations

The preparations according to the invention, such as, for example, hair shampoos, hair lotions, foam baths, creams, gels, lotions or emollients, may contain mild surfactants, oil components, emulsifiers, superfatting agents, pearlizing waxes, stabilizers, consistency factors, thickeners, polymers, silicone compounds, biogenic agents, deodorizing agents, anti-dandruff agents, film formers, preservatives, hydrotropes, solubilizers, UV protection factors, antioxidants, insect repellents, self-tanning agents, perfume oils, dyes and the like as further auxiliaries and additives.

Typical examples of suitable mild, i.e. particularly dermatologically compatible, **surfactants** are fatty alcohol polyglycol ether sulfates, monoglyceride sulfates, mono- and/or dialkyl sulfosuccinates, fatty acid isethionates, fatty acid sarcosinates, fatty acid taurides, fatty acid glutamates, ether carboxylic acids, alkyl oligoglucosides, fatty acid glucamides, alkyl amidobetaines and/or protein fatty acid condensates (preferably based on wheat proteins).

Superfatting agents may be selected from such substances as, for example, lanolin and lecithin and also polyethoxylated or acylated lanolin and lecithin derivatives, polyol fatty acid esters, monoglycerides and fatty acid alkanolamides, the fatty acid alkanolamides also serving as foam stabilizers.

Suitable **pearlizing waxes** are, for example, alkylene glycol esters, especially ethylene glycol distearate; fatty acid alkanolamides, especially cocofatty acid diethanolamide; partial glycerides, especially stearic acid monoglyceride; esters of polybasic, optionally hydroxysubstituted carboxylic acids with fatty alcohols containing 6 to 22 carbon atoms, especially long-chain esters of tartaric acid; fatty compounds, such as for example fatty alcohols, fatty ketones, fatty aldehydes, fatty ethers and fatty carbonates which contain in all at least 24 carbon atoms, especially laurone

and distearylether; fatty acids, such as stearic acid, hydroxystearic acid or behenic acid, ring opening products of olefin epoxides containing 12 to 22 carbon atoms with fatty alcohols containing 12 to 22 carbon atoms and/or polyols containing 2 to 15 carbon atoms and 2 to 10 hydroxyl groups and mixtures thereof.

The **consistency factors** mainly used are fatty alcohols or hydroxyfatty alcohols containing 12 to 22 and preferably 16 to 18 carbon atoms and also partial glycerides, fatty acids or hydroxyfatty acids. A combination of these substances with alkyl oligoglucosides and/or fatty acid N-methyl glucamides of the same chain length and/or polyglycerin poly-12-hydroxystearates is preferably used. Suitable **thickeners** are, for example, polysaccharides, more especially xanthan gum, guar-guar, agar-agar, alginates and tyloses, carboxymethyl cellulose and hydroxyethyl cellulose, also relatively high molecular weight polyethylene glycol monoesters and diesters of fatty acids, polyacrylates (for example Carbopols® [Goodrich] or Synthalens® [Sigma]), polyacrylamides, polyvinyl alcohol and polyvinyl pyrrolidone, surfactants such as, for example, ethoxylated fatty acid glycerides, esters of fatty acids with polyols, for example pentaerythritol or trimethylol propane, narrow-range fatty alcohol ethoxylates or alkyl oligoglucosides and electrolytes, such as sodium chloride and ammonium chloride.

Suitable **cationic polymers** are, for example, cationic cellulose derivatives such as, for example, the quaternized hydroxyethyl cellulose obtainable from Amerchol under the name of Polymer JR 400®, cationic starch, copolymers of diallyl ammonium salts and acrylamides, quaternized vinyl pyrrolidone/vinyl imidazole polymers such as, for example, Luviquat® (BASF), condensation products of polyglycols and amines, quaternized collagen polypeptides such as, for example, Lauryldimonium Hydroxypropyl Hydrolyzed Collagen (Lamequat® L, Grünau), quaternized wheat polypeptides, polyethyleneimine, cationic silicone polymers such as, for

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example, Amodimethicone, copolymers of adipic acid and dimethylamino-hydroxypropyl diethylenetriamine (Cartaretine®, Sandoz), copolymers of acrylic acid with dimethyl diallyl ammonium chloride (Merquat® 550, Chemviron), polyaminopolyamides as described, for example, in **FR-A 2 252 840** and crosslinked water-soluble polymers thereof, cationic chitin derivatives such as, for example, quaternized chitosan, optionally in micro-crystalline distribution, condensation products of dihaloalkyls, for example dibromobutane, with bis-dialkylamines, for example bis-dimethylamino-1,3-propane, cationic guar gum such as, for example, Jaguar®CBS, Jaguar®C-17, Jaguar®C-16 of Celanese, quaternized ammonium salt polymers such as, for example, Mirapol® A-15, Mirapol® AD-1, Mirapol® AZ-1 of Miranol.

Suitable **anionic, zwitterionic, amphoteric and nonionic polymers** are, for example, vinyl acetate/crotonic acid copolymers, vinyl pyrrolidone/vinyl acrylate copolymers, vinyl acetate/butyl maleate/isobornyl acrylate copolymers, methyl vinyl ether/maleic anhydride copolymers and esters thereof, uncrosslinked and polyol-crosslinked polyacrylic acids, acrylamidopropyl trimethylammonium chloride/acrylate copolymers, octylacrylamide/methyl methacrylate/tert.-butylaminoethyl methacrylate/2-hydroxypropyl methacrylate copolymers, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, vinyl pyrrolidone/dimethylaminoethyl methacrylate/vinyl caprolactam terpolymers and optionally derivatized cellulose ethers and silicones.

Suitable **silicone compounds** are, for example, dimethyl polysiloxanes, methylphenyl polysiloxanes, cyclic silicones and amino-, fatty acid-, alcohol-, polyether-, epoxy-, fluorine-, glycoside- and/or alkyl-modified silicone compounds which may be both liquid and resin-like at room temperature. A detailed overview of suitable volatile silicones by Todd et al. can be found in **Cosm. Toil. 91, 27 (1976)**.

Typical examples of **fats** are glycerides while suitable **waxes** are

inter alia beeswax, carnauba wax, candelilla wax, montan wax, paraffin wax, hydrogenated castor oils, fatty acid esters solid at room temperature or microwaxes, optionally in combination with hydrophilic waxes, for example cetyl stearyl alcohol or partial glycerides. Metal salts of fatty acids
5 such as, for example, magnesium, aluminium and/or zinc stearate may be used as **stabilizers**.

In the context of the invention, **biogenic agents** are, for example, tocopherol, tocopherol acetate, tocopherol palmitate, ascorbic acid, deoxyribonucleic acid, retinol, bisabolol, allantoin, phytantriol, panthenol,
10 AHA acids, amino acids, ceramides, pseudoceramides, essential oils, plant extracts and vitamin complexes.

Suitable **deodorizing agents** are, for example, antiperspirants, such as aluminium chlorhydrates. These antiperspirants are colorless hygroscopic crystals which readily deliquesce in air and which accumulate
15 when aqueous aluminium chloride solutions are concentrated by evaporation. Aluminium chlorhydrate is used for the production of perspiration-inhibiting and deodorizing compositions and probably acts by partially blocking the sweat glands through the precipitation of proteins and/or polysaccharides [cf. **J. Soc. Cosm. Chem.** 24, 281 (1973)]. For
20 example, an aluminium chlorhydrate which corresponds to the formula $[Al_2(OH)_5Cl] \cdot 2.5H_2O$ and which is particularly preferred for the purposes of the invention is commercially available under the name of Locron® from Hoechst AG of Frankfurt, FRG [cf. **J. Pharm. Pharmacol.** 26, 531 (1975)].
Besides the chlorhydrates, aluminium hydroxylactates and acidic
25 aluminium/zirconium salts may also be used. Other suitable deodorizing agents are esterase inhibitors, preferably trialkyl citrates, such as trimethyl citrate, tripropyl citrate, triisopropyl citrate, tributyl citrate and, in particular, triethyl citrate (Hydagen® CAT, Henkel KGaA, Düsseldorf, FRG). Esterase inhibitors inhibit enzyme activity and thus reduce odor formation. The free
30 acid is probably released through the cleavage of the citric acid ester,

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reducing the pH value of the skin to such an extent that the enzymes are inhibited. Other esterase inhibitors are dicarboxylic acids and esters thereof, for example glutaric acid, glutaric acid monoethyl ester, glutaric acid diethyl ester, adipic acid, adipic acid monoethyl ester, adipic acid diethyl ester, malonic acid and malonic acid diethyl ester, hydroxycarboxylic acids and esters thereof, for example citric acid, malic acid, tartaric acid or tartaric acid diethyl ester. Antibacterial agents which influence the germ flora and destroy or inhibit the growth of perspiration-decomposing bacteria, may also be present in stick products. Examples of such antibacterial agents are chitosan, phenoxyethanol and chlorhexidine gluconate. 5-Chloro-2-(2,4-dichlorophenoxy)-phenol, which is marketed under the name of Irgasan® by Ciba-Geigy of Basel, Switzerland, has also proved to be particularly effective.

Suitable **antidandruff agents** are climbazol, octopirox and zinc pyrithione. Standard **film formers** are, for example, chitosan, microcrystalline chitosan, quaternized chitosan, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, polymers of the acrylic acid series, quaternary cellulose derivatives, collagen, hyaluronic acid and salts thereof and similar compounds. Suitable **swelling agents** for aqueous phases are montmorillonites, clay minerals, Pemulen and alkyl-modified Carbopol types (Goodrich). Other suitable polymers and swelling agents can be found in R. Lochhead's review in **Cosm. Toil.** 108, 95 (1993).

UV protection factors in the context of the invention are, for example, organic substances (light filters) which are liquid or crystalline at room temperature and which are capable of absorbing ultraviolet radiation and of releasing the energy absorbed in the form of longer-wave radiation, for example heat. UV-B filters can be oil-soluble or water-soluble. The following are examples of oil-soluble substances:

- 3-benzylidene camphor or 3-benzylidene norcamphor and derivatives



thereof, for example 3-(4-methylbenzylidene)-camphor as described in **EP-B1 0693471**;

- 5 ○ 4-aminobenzoic acid derivatives, preferably 4-(dimethylamino)-benzoic acid-2-ethylhexyl ester, 4-(dimethylamino)-benzoic acid-2-octyl ester and 4-(dimethylamino)-benzoic acid amyl ester;
- esters of cinnamic acid, preferably 4-methoxycinnamic acid-2-ethylhexyl ester, 4-methoxycinnamic acid propyl ester, 4-methoxycinnamic acid isoamyl ester, 2-cyano-3,3-phenylcinnamic acid-2-ethylhexyl ester (Octocrylene);
- 10 ○ esters of salicylic acid, preferably salicylic acid-2-ethylhexyl ester, salicylic acid-4-isopropylbenzyl ester, salicylic acid homomenthyl ester;
- derivatives of benzophenone, preferably 2-hydroxy-4-methoxybenzophenone, 2-hydroxy-4-methoxy-4'-methylbenzophenone, 2,2'-dihydroxy-4-methoxybenzophenone;
- 15 ○ esters of benzalmalonic acid, preferably 4-methoxybenzalmalonic acid di-2-ethylhexyl ester;
- triazine derivatives such as, for example, 2,4,6-trianilino-(p-carbo-2'-ethyl-1'-hexyloxy)-1,3,5-triazine and Octyl Triazone as described in **EP-A1 0818450**;
- 20 ○ propane-1,3-diones such as, for example, 1-(4-tert.butylphenyl)-3-(4'-methoxyphenyl)-propane-1,3-dione;
- ketotricyclo(5.2.1.0)decane derivatives as described in **EP-B1 0694521**.

Suitable water-soluble substances are

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- 2-phenylbenzimidazole-5-sulfonic acid and alkali metal, alkaline earth metal, ammonium, alkylammonium, alkanolammonium and glucammonium salts thereof;
- sulfonic acid derivatives of benzophenones, preferably 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid and salts thereof;
- 30

- o sulfonic acid derivatives of 3-benzylidene camphor such as, for example, 4-(2-oxo-3-bornylidenemethyl)-benzene sulfonic acid and 2-methyl-5-(2-oxo-3-bornylidene)-sulfonic acid and salts thereof.

5 Typical UV-A filters are, in particular, derivatives of benzoyl methane such as, for example, 1-(4'-tert.butylphenyl)-3-(4'-methoxyphenyl)-propane-1,3-dione, 4-tert.butyl-4'-methoxydibenzoyl methane (Parsol 1789) or 1-phenyl-3-(4'-isopropylphenyl)-propane-1,3-dione. The UV-A and UV-B filters may of course also be used in the form of mixtures. Besides the
10 soluble substances mentioned, insoluble light-blocking pigments, i.e. finely dispersed metal oxides or salts, may also be used for this purpose. Examples of suitable metal oxides are, in particular, zinc oxide and titanium dioxide and also oxides of iron, zirconium oxide, silicon, manganese, aluminium and cerium and mixtures thereof. Silicates (talcum), barium
15 sulfate and zinc stearate may be used as salts. The oxides and salts are used in the form of the pigments for skin-care and skin-protecting emulsions and decorative cosmetics. The particles should have a mean diameter of less than 100 nm, preferably between 5 and 50 nm and more preferably between 15 and 30 nm. They may be spherical in shape
20 although ellipsoidal particles or other non-spherical particles may also be used. So-called micro- or nanopigments are preferably used in sun protection products. Micronized zinc oxide is preferably used.

Other suitable UV filters can be found in P. Finkel's review in **SOFW-Journal 122, 543 (1996)**.

25 Besides the two groups of primary sun protection factors mentioned above, secondary sun protection factors of the **antioxidant** type may also be used. Secondary sun protection factors of the antioxidant type interrupt the photochemical reaction chain which is initiated when UV rays penetrate into the skin. Typical examples are amino acids (for example glycine,
30 histidine, tyrosine, tryptophane) and derivatives thereof, imidazoles (for

example urocanic acid) and derivatives thereof, peptides, such as D,L-carnosine, D-carnosine, L-carnosine and derivatives thereof (for example anserine), carotinoids, carotenes (for example α -carotene, β -carotene, lycopene) and derivatives thereof, chlorogenic acid and derivatives thereof, 5 liponic acid and derivatives thereof (for example dihydroliponic acid), aurothioglucose, propylthiouracil and other thiols (for example thioredoxine, glutathione, cysteine, cystine, cystamine and glycosyl, N-acetyl, methyl, ethyl, propyl, amyl, butyl and lauryl, palmitoyl, oleyl, γ -linoleyl, cholesteryl and glyceryl esters thereof) and their salts, dilaurylthiodipropionate, 10 distearylthiodipropionate, thiodipropionic acid and derivatives thereof (esters, ethers, peptides, lipids, nucleotides, nucleosides and salts) and sulfoximine compounds (for example butionine sulfoximines, homocysteine sulfoximine, butionine sulfones, penta-, hexa- and hepta-thionine sulfoximine) in very small compatible dosages (for example pmole to 15 μ mole/kg), also (metal) chelators (for example α -hydroxyfatty acids, palmitic acid, phytic acid, lactoferrine), α -hydroxy acids (for example citric acid, lactic acid, malic acid), humic acid, bile acid, bile extracts, bilirubin, biliverdin, EDTA, EGTA and derivatives thereof, unsaturated fatty acids and derivatives thereof (for example γ -linolenic acid, linoleic acid, oleic acid), 20 folic acid and derivatives thereof, ubiquinone and ubiquinol and derivatives thereof, vitamin C and derivatives thereof (for example ascorbyl palmitate, Mg ascorbyl phosphate, ascorbyl acetate), tocopherols and derivatives (for example vitamin E acetate), vitamin A and derivatives (vitamin A palmitate) and coniferyl benzoate of benzoin resin, rutinic acid and derivatives 25 thereof, α -glycosyl rutin, ferulic acid, furfurylidene glucitol, carnosine, butyl hydroxytoluene, butyl hydroxyanisole, nordihydroguaiaic resin acid, nordihydroguaiaietic acid, trihydroxybutyrophenone, uric acid and derivatives thereof, mannose and derivatives thereof, Superoxid-Dismutase, zinc and derivatives thereof (for example ZnO, ZnSO₄), 30 selenium and derivatives thereof (for example selenium methionine),

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stilbenes and derivatives thereof (for example stilbene oxide, trans-stilbene oxide) and derivatives of these active substances suitable for the purposes of the invention (salts, esters, ethers, sugars, nucleotides, nucleosides, peptides and lipids).

5 In addition, **hydrotropes**, such as, for example, ethanol, isopropyl alcohol or polyols may be used to improve flow behavior. Suitable polyols preferably contain 2 to 15 carbon atoms and at least two hydroxyl groups. Typical examples are

- 10 ○ glycerin;
- alkylene glycols such as, for example, ethylene glycol, diethylene glycol, propylene glycol, butylene glycol, hexylene glycol and polyethylene glycols having an average molecular weight of 100 to 1,000 dalton;
- technical oligoglycerin mixtures with a degree of self-condensation of
- 15 1.5 to 10 such as, for example, technical diglycerin mixtures with a diglycerin content of 40 to 50% by weight;
- methylol compounds such as, in particular, trimethylol ethane, trimethylol propane, trimethylol butane, pentaerythritol and dipentaerythritol;
- 20 ○ lower alkyl glucosides, particularly those containing 1 to 8 carbon atoms in the alkyl group, for example methyl and butyl glucoside;
- sugar alcohols containing 5 to 12 carbon atoms such as, for example, sorbitol or mannitol;
- sugars containing 5 to 12 carbon atoms such as, for example, glucose
- 25 or sucrose and
- aminosugars such as, for example, glucamine.

 Suitable **preservatives** are, for example, phenoxyethanol, formaldehyde solution, parabens, pentanediol or sorbic acid and the other classes

30 of substances listed in **Appendix 6, Parts A and B of the**

"**Kosmetikverordnung** (Cosmetics Directive)". Suitable **insect repellents** are N,N-diethyl-m-toluamide, pentane-1,2-diol or Insect Repellent 3535. A suitable **self-tanning agent** is dihydroxyacetone.

Suitable **perfume oils** are mixtures of natural and synthetic
5 fragrances. Natural fragrances include the extracts of blossoms (lily, lavender, rose, jasmine, neroli, ylang-ylang), stems and leaves (geranium, patchouli, petitgrain), fruits (anise, coriander, caraway, juniper), fruit peel (bergamot, lemon, orange), roots (nutmeg, angelica, celery, cardamon, costus, iris, calmus), woods (pinewood, sandalwood, guaiac wood,
10 cedarwood, rosewood), herbs and grasses (tarragon, lemon grass, sage, thyme), needles and branches (spruce, fir, pine, dwarf pine), resins and balsams (galbanum, elemi, benzoin, myrrh, olibanum, opoponax). Animal raw materials, for example civet and beaver, may also be used. Typical synthetic perfume compounds are products of the ester, ether, aldehyde,
15 ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, phenoxyethyl isobutyrate, p-tert.butyl cyclohexylacetate, linalyl acetate, dimethyl benzyl carbonyl acetate, phenyl ethyl acetate, linalyl benzoate, benzyl formate, ethylmethyl phenyl glycinate, allyl cyclohexyl propionate, styrallyl propionate and benzyl
20 salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxycitronellal, lilial and bourgeonal. Examples of suitable ketones are the ionones, α -isomethylionone and methyl cedryl ketone. Suitable
25 alcohols are anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpineol. The hydrocarbons mainly include the terpenes and balsams. However, it is preferred to use mixtures of different perfume compounds which, together, produce an agreeable fragrance. Other suitable perfume oils are essential oils of relatively low volatility
30 which are mostly used as aroma components. Examples are sage oil,

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camomile oil, clove oil, melissa oil, mint oil, cinnamon leaf oil, lime-blossom oil, juniper berry oil, vetiver oil, olibanum oil, galbanum oil, labolanum oil and lavandin oil. The following are preferably used either individually or in the form of mixtures: bergamot oil, dihydromyrcenol, lilial, lylal, citronellol, phenylethyl alcohol, α -hexylcinnamaldehyde, geraniol, benzyl acetone, cyclamen aldehyde, linalool, Boisambrene Forte, Ambroxan, indole, hedione, sandelice, citrus oil, mandarin oil, orange oil, allylamyl glycolate, cyclovertal, lavandin oil, clary oil, β -damascone, geranium oil bourbon, cyclohexyl salicylate, Vertofix Coeur, Iso-E-Super, Fixolide NP, evernyl, iraldein gamma, phenylacetic acid, geranyl acetate, benzyl acetate, rose oxide, romillat, irotyl and floramat.

Suitable **dyes** are any of the substances suitable and approved for cosmetic purposes as listed, for example, in the publication "**Kosmetische Färbemittel**" of the **Farbstoffkommission der Deutschen Forschungsgemeinschaft, Verlag Chemie, Weinheim, 1984, pages 81 to 106**, These dyes are normally used in concentrations of 0.001 to 0.1% by weight, based on the mixture as a whole.

The total percentage content of auxiliaries and additives may be from 1 to 50% by weight and is preferably from 5 to 40% by weight, based on the particular formulation. The formulations may be prepared by standard cold or hot processes and are preferably produced by the phase inversion temperature method.

Examples

Examples 1 and 2, Comparison Examples 1 to 4. In a volunteer test, the moisture status of the skin was tested before (C1) and at 30-minute intervals after application of a cream (2 mg/cm²; 23°C; 10 mins. acclimatization; 30% relative humidity) containing glycerin carbonate (Examples 1,2) or no glycerin carbonate (Comparison Examples C2 to C4) using a Corneometer (CM 820 PC, Courage and Khazaka, Cologne). The

results are set out in Tables 1 and 2 and show that the emulsions containing glycerin carbonate produce distinctly higher skin moisture levels over the test duration. In addition, a cream containing glycerin carbonate was found to have a longer-lasting effect than the placebo (-) and the

5 cream containing glycerin (-).

Table 1**Performance results (quantities as % by weight active substance)**

Composition	C1	C2	C3	C4	1	2
Glyceryl Stearate	-	2.7 4.0 5.0 17.1 4.7 0.3				
Cetearyl Alcohol	-					
Caprylic/Capric Triglyceride	-					
Petrolatum	-					
PEG-20 Glyceryl Stearate	-					
Dimethicone	-					
Glycerin	-	-	5.0	20.0	-	-
Glycerin Carbonate	-	-	-	-	5.0	20.0
Water, preservative	-	to 100				

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Table 2

**Performance results (skin moisture status), difference between
Corneometer values of treated and untreated skin**

Moisture status after [mins.]	C1	C2	C3	C4	1	2
0	0	0	0	0	0	0
30	1.2	15.6	16.0	24.0	28.7	40.4
60	1.1	12.5	15.9	20.8	26.9	38.4
120	0.8	10.3	15.4	17.6	25.25	32.8
180	0.8	7.8	11.7	11.5	21.85	30.04
300	0.8	5.4	9.9	7.4	19.65	26.64
Effectiveness		-	-	-	+	+

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